

# South Fork Elk River Management Plan

## Green Diamond Resource Co

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Green Diamond Resource Co. (GDRCo) has developed the South Fork Elk River Management Plan (SFERMP) to propose a sediment reduction strategy for its timberland ownership within the South Fork of Elk River Watershed (See Attachment Watershed Overview Map). The key goal of this strategy is to design and implement operational procedures and measures specifically aimed at reducing sediment production, transport, and deposition into watercourses. This plan specifically describes the measures the company intends to apply to ensure that its operations will achieve this goal, protect water quality and beneficial uses and mitigate or avoid significant impacts to the aquatic habitat. These measures were conceived and developed in the context of watershed-specific physical characteristics, past management activities, and future GDRCo management objectives of South Fork Elk River. The watershed is significantly influenced by a geologic formation known as the Wildcat Group. This formation incorporates undifferentiated rocks composed of soft yellowish brown to bluish gray siltstones, clay stones and fine sandstones, which, because of their lack of strength and durability, are prone to erosion. This fine grained material becomes easily mobilized and has a high potential to reach fish bearing stream habitat.

Recognizing the underlying geology and the erodible nature of the soils within significant areas of the South Fork Elk River Watershed and acknowledging that GDRCo plans on re-entering the South Fork Elk River watershed (within its ownership) to harvest timber and maintain road systems; it is deemed necessary and appropriate that watershed specific measures be instituted to ensure the continued protection and enhancement of water quality and aquatic habitat. The SFERMP addresses watershed specific operating procedures in the following five key categories: A) Riparian Prescriptions, B) Geological Prescriptions, C) Harvesting, Yarding and Hauling Prescriptions, D) Road Management and E) Seasonal Restrictions.

These categories include practices directed toward managing riparian zones to protect aquatic habitat, minimizing soil disturbance, minimizing movement of sediment into watercourses, and identifying potential off-site measures which could aid in reducing overall sediment contribution to the system. Green Diamond will follow these measures during administrative activities and incorporate these measures into THPs, within GDRCo's South Fork Elk River property.

### A. Riparian Prescriptions

- 1) Class I WLPZ:
  - a) 150 feet on each side of the watercourse.
  - b) At least 85% overstory will be retained, where it currently exists, within the first 75 feet of the watercourse and at least 70% within the remainder of the Class I WLPZ. 70% of the overstory canopy and understory vegetation within all Class I WLPZ's will be retained.
  - c) Class I watercourses will be provided with an additional 25 foot SOZ on slopes between 0-30% or 50 foot SOZ on slopes >30%, where understory vegetation, hardwoods and mid-canopy conifers will be retained on site.

- 2) Class II WLPZ:
- a) 75 feet on each side of the watercourse.
  - b) At least 70% total canopy will be retained of which 50% will consist of overstory conifers, where it currently exists.
  - c) Class II watercourses that exhibit inner gorge characteristics (as defined in the California FPRs) will be provided with an additional 25 foot SOZ where all hardwoods and non-merchantable conifers will be retained.
- 3) Class III protection measures:
- GDRCo will apply one of two levels of protection measures within Class III watercourses on their ownership within South Fork Elk River. Class III watercourses having average side slopes under 60% will be provided Level A protection measures and Class III watercourses having average side slopes over 60% will be provided Level B protection measures.
- a) Level A Class III Protection Measures:
- o 30' ELZ (allows existing roads, existing watercourse crossings, and proposed mitigated watercourse crossings).
  - o Retention of Channel Zone Trees\*\* – all species.
  - o Broadcast burning will not occur within GDRCo's properties in South Fork Elk River.
- b) Level B Class III Protection Measures:
- o 50' ELZ (allows existing roads, existing watercourse crossings, and proposed mitigated watercourse crossings).
  - o Retain Channel Zone Trees\*\* – all species.
  - o Retain all hardwoods and nonmerchantable conifers located within the ELZ.
  - o Broadcast burning will not occur within GDRCo's properties in the South Fork of Elk River.

\*\* A "Channel Zone Tree" is defined as follows: A tree with its trunk or surface roots located within the channel or extending into the channel. Typically these trees serve the function as "control points" (retaining sediment and/or preventing channel head cutting) within the channel. When growing on the bank with surface roots extending into the channel, trees can also contribute to overall bank stability.

## **B. Geologic Prescriptions**

A California licensed RPF is responsible for conducting field reconnaissance of all proposed timber harvest units specifically for the purpose of identifying unstable areas, as described by the California Forest Practice Rules and using California Licensed Forestry Association 1999 Check List. The RPF is also responsible for determining the need for additional site assessment by a California licensed Professional Geologist based on the presence or absence of indicators of unstable areas.

RPFs may exercise professional discretion to avoid operations in unstable areas. Complete avoidance of operations in unstable areas is typically considered to be the most conservative possible prescription that can be applied to unstable areas. For that reason, where unstable areas are avoided, RPFs will not necessarily retain the services of a Professional Geologist for further site evaluation and prescription development and a geological report will not typically be included with a proposed THP as a matter of necessity. However, a 25 foot no cut buffer, beginning at the scarp, will be retained around the unstable feature. In the specific case of identification of headwall swales, the RPF will retain the services of a Professional Geologist for further site evaluation and prescription development or incorporate the following measures: 1) no road construction across the feature; 2) no heavy equipment on the feature, and 3) harvest no more than 50% of the basal area.

Where RPFs determine that unstable areas or indicators of unstable areas exist within a harvest unit and they require a professional geological assessment, RPFs will consult with GDRCo's staff geologist to develop appropriate site-specific forestry-related prescriptions. Professional geological assessments also may be performed by qualified licensed professional geological consultants, depending on workload or scheduling constraints of GDRCo's staff geologist. Professional Geologists who conduct geological assessments for RPFs must comply with the California Department of Consumer Affairs Geological Licensing Act and will be expected to utilize professional discretion to follow the guidelines of the California Department of Conservation Division of Mines and Geology Note 45 (Guidelines for Engineering Geological Reports for Timber Harvesting Plans) to whatever extent may be necessary depending on site-specific conditions and the scope of a given project.

## **C. Harvesting, Yarding and Hauling Prescriptions**

The following prescriptions have been developed to ensure that GDRCo logging operations are designed and implemented to minimize overall ground disturbance that could generate and cause sediment delivery into watercourses.

- 1) GDRCo will adhere to a six year harvest adjacency versus the three year adjacency requirement in the California FPRs. This extension of the harvest adjacency in this watershed will serve to further reduce potential impacts from harvest activities and will distribute them over greater time and space.
- 2) Skyline cable yarding systems will be the preferred harvest method on slopes averaging greater than 35%.
- 3) In areas where road construction would require building across steep slopes with large amounts of endhaul construction, long cable skyline yarding (average yarding distance >1000 feet) will be prescribed in areas with long continuous steeper slopes, therefore eliminating the need for additional roads. Emphasizing both short and long skyline cable yarding systems will reduce the overall road mileage and site impacts that are associated with road building as well as reduce impacts associated with ground based yarding systems.
- 4) GDRCo intends to use shovel logging in ground based harvest areas. Ground based yarding will be limited to slopes less than 35%. Shovel logging has been shown to minimize ground disturbance due to low ground pressure, no need to construct skid trails, operating on top of slash rather than bare soil, and the opportunity to utilize residual vegetation to slash pack temporary constructed haul roads to minimize raindrop impact and surface erosion. Exceptions to shovel logging will be confined to isolated areas where topographic conditions or other circumstances would require excessive road construction to utilize cable yarding. In these circumstances other ground based equipment may be required and its use will be explained and justified during the THP approval process.
- 5) Newly constructed temporary roads located in shovel logging areas will be decommissioned by removing temporary crossings, draining the road (waterbars and rolling dips) and slash packing the road surface prior to closure.
- 6) Helicopter yarding will be considered and prescribed in areas that would require the construction of roads across steep slopes with high hazard topography (i.e. unstable slopes). Although this harvesting method is expected to have limited use within the watershed, its application if required, will be explained and justified in the THP.
- 7) See seasonal restrictions below for harvesting, yarding and hauling activities.

- 8) No broadcast burning will be conducted in South Fork Elk River. Burning of piles accumulated during harvesting operations, may occur.

## **D. Road Management Prescriptions**

GDRCo has recently commissioned a full road assessment within our ownership for South Fork Elk River. An accompanying road network assessment map of GDRCo's ownership within the Elk River Watershed will depict the known distribution and current condition of roads within the drainage. GDRCo will develop and follow a S. F. Elk River Road Management Plan that will prioritize all assessment sites located within the drainage and propose recommendations for treatment within the next 15 years.

As part of this management plan, GDRCo intends to systematically find and treat controllable sediment discharge sources across its SF Elk River ownership.

Each site will be addressed according to the following basic strategy:

- Inventory
- Prioritize and Schedule for Treatment
- Develop and Implement a Work plan for Treatment
- Monitor and Report

This strategy will be directed and completed through WDR requirements for GDRCo lands in the SF Elk River.

Taking into consideration the location of these roads, relative condition, potential future risk of failure (due to location), and the location for long term future use, specific roads and road segments have been identified to be either upgraded or decommissioned. Some roads will be decommissioned permanently, and others will be temporarily decommissioned (ear marked for eventual reconstruction and upgrading in the future (20-30 years) when the surrounding young plantations are ready for harvest and road access is again needed. In either case, the goal of the decommissioning process is to remove the need for continued maintenance as well as removing the risk of road related sediment input from crossing failures, diversions, and side cast failures. Roads chosen for decommissioning will be essentially hydrologically disconnected from the stream network so that the potential for future road related sediment introduction into watercourses would be minimal. Roads not designated for decommissioning will be upgraded to the "Road Upgrading" procedures outlined below. These roads as well as newly constructed roads in the future will be part of our permanent transportation system and consist of roads that are properly located, hydrologically disconnected and well maintained. Operational procedures have been developed for all road types so that, after treatment, sediment delivery into watercourses will be mitigated.

### **I. Road Decommissioning**

Over the past five to six years of decommissioning experience, GDRCo has learned that there is value in insuring that the project is implemented correctly and efficiently the first time. By insuring that all reasonable and feasible operational procedures are site specifically identified and carried out during the decommission process, efficiency is maximized and the risk of unacceptable future failures or significant streambed adjustments is minimized. The following Operational Procedures for road decommissioning are designed to meet this goal.

- a) Candidates for decommissioning will be based upon the PWA road assessment information coupled with GDRCo's long term road access requirements for the watershed.
- b) Priority will be based on the potential risk of impending future failure and the likelihood of sediment introduction from sites identified during the inventory.

- c) Any unstable or potentially unstable road or landing fill identified during the assessment process will be pulled back and spoil deposited in a stable location to ensure that perched fill or organic material does not pose a risk of failure and sediment delivery to a watercourse. Erosion control measures (e.g. seeding and mulching, planting, matting, erosion netting) will be utilized, where appropriate, to minimize surface erosion at excavated areas.
- d) Ditch lines will be intercepted by rolling dips or deep water bars constructed to assure water drains across the old road prism at the constructed feature and no longer along the ditch and into a watercourse. Localized out-sloping may be necessary to adequately drain the road surface. Ditch relief culverts will be pulled or completely closed (by collapsing with an excavator).
- e) All culverts and associated fills installed at watercourse crossings will be completely removed and the stream bed returned to its original gradient and width. All fill material or buried organics will be removed from the crossing site so that the resulting side slopes are designed to a 2:1 slope ratio or to the natural existing side slopes.
- f) Old sediment deposits (wedges) located immediately upstream from the old culvert head will be removed to the practical extent feasible. Hard points, LWD, or grade break rocks will be utilized to keep head cutting to occur above the removed sediment deposits.
- g) Disconnect water bars or rolling dips will be installed upstream from pulled stream crossings to ensure road surface sediments are prevented from entering into the stream.
- h) All pulled stream crossings will be treated with straw mulch at 2" depth and 90% coverage.
- i) To further guard against road surface rilling and sheet erosion associated with erodible Wildcat soil types, GDRCo will treat all decommissioned road surfaces with grass seed and straw mulch at 2" depth and 90% coverage.
- j) All designated waste disposal sites will be compacted with a tractor or excavator packed in lifts and treated with straw mulch and grass seeded.

- k) An emphasis and priority will be made to initiate and finish all pull back sites and stream crossing removals on a specific road during the same summer season if feasible. If the road to be decommissioned can not be completed in one season due to weather or operational constraints, the following procedure will be initiated to minimize any additional sediment contribution from ECP points until final site completion occurs:

Sites not treated by the pull back, disconnect, and mulch/seed protocol, will be left in a “no further disturbance” condition. This means partially failing stream crossings will have the holes and depressions of the fills temporarily filled and packed with hay bails and/or clean wood chunks and covered with a layer of soil for short term minimal equipment access to lower sites. These temporary sites will be constructed to be easily pulled back out without the need for refilling a fill with soil. The intent of this practice is to ensure that operations do not introduce any additional sediment into watercourses and that these sites that can not feasibly be treated via permanent pull back of all soil and organics in one season will be prepared for “over wintering” with clean materials that can be retrieved the next operating season. At that time, the temporary fill structure can be utilized to access equipment to achieve necessary decommissioning past the site and/or pulled out correctly that final season.
- l) Some roads have been abandoned and are in a condition where no treatment would be required because they are completely revegetated, no longer pose a threat to aquatic systems, and are in a condition that would render the disturbance inherent in decommissioning counter-productive. The road assessment process will determine whether treating certain roads or road segments would be counter-productive.
- m) GDRCo field personnel will work cooperatively with water quality staff to ensure that the final decommissioning product meets the expectations and mutual goals.

## **II. Road Upgrading**

It is GDRCo's goal to ensure that all roads designated for upgrading will be improved in such a way as to minimize future risk for failure and resulting sediment delivery to watercourses. The following Operational Procedures for road upgrading are designed to meet this goal:

- a) All culverted watercourse crossing replacements will be designed to handle a 100-year return interval flow event including sediment and debris. The design flow will be calculated using the Waananen and Crippen (1977) method for drainage areas greater than or equal to 80 acres. The Rational Method (Chow 1964) will be used when the drainage area for a crossing is less than 80 acres. Culverts will be sized to pass the 100-year flow event without overtopping (headwater depth to culvert diameter ratio  $(HW/D) = 1.0$ ) which takes into account potential effects of sediment and debris. Other comparable flow design estimators that are developed for the North Coast Region may also be used.
- b) Bridges will be installed on fish-bearing watercourses where feasible. When a bridge installation is not feasible, a countersunk or bottomless culvert or other “fish-friendly” structure will be installed that will provide upstream and downstream fish passage. Installed culverts will not restrict the active channel flow.
- c) The same installation standards apply that are discussed under the “New Road Construction” section when replacing washed out culverts, upgrading existing culverts, or replacing culverts on previously decommissioned roads. Any buried logs or other large organic debris will be removed from the crossing fill.

- d) Ditch relief culverts will be installed to meet the following specifications\*\*:

| Road Grade | Maximum Spacing (Feet)<br>for ditch relief culverts |
|------------|---|
| 2%         | 600   |
| 4%         | 530   |
| 6%         | 355   |
| 8%         | 265   |
| 10%        | 210   |
| 12%        | 180   |
| 14%        | 155   |
| 16%        | 135   |
| 18%        | 115   |

\*\* Additional ditch relief culverts will be installed if site specific erosion indicators continue to exist.

- e) Procedures designed to ensure sediment is not mobilized during winter quad use and delivered to watercourses is provided in the Road Sediment Reduction Plan (See Section D IV).
- f) Upgrading of roads will follow the New Road Construction standards discussed below.

### **III. New Road Construction**

- a) As part of THP preparation, foresters perform a detailed field reconnaissance to identify and locate the best access between topographic control points that are critical to a harvesting operation.
- b) Mainline and secondary roads will typically have a combination of out-sloped (with rolling dips) and crowned (with inside ditches) road construction where appropriate, with occasional turnouts.
- c) New roads will be constructed so the road network will not drain directly into watercourses (hydrologically disconnected).
- d) Slash and other debris from road construction will not be incorporated into the road prism, fills or sidecast material. When feasible, slash and debris will be placed parallel to the toe of road fill slopes as a filter windrow. Slash will not be bunched against residual trees or placed in locations where it may gain entry into Class I, II, or III watercourses.
- e) Every attempt will be made to avoid locating roads on steep slopes and unstable areas.
- f) Other detailed road specifications can be found in GDRCo's Road Construction Specifications document which is attached to all individual THPs.
- g) Final grades will not exceed 15%, as measured in minimum 100-foot increments, except to avoid unstable slopes or to access a suitable watercourse crossing location. The intent is to minimize steeper road grades to have a lower risk road; but have the flexibility to run steeper grades where appropriate to reach strategic control points and avoid higher risk topography.

- h) All overhanging cut slopes will be removed.
- i) The use of through cuts will be avoided where feasible. In areas where through cuts cannot be avoided (e.g., to avoid steep slopes, unstable slopes) permanent ditch-outs will be installed at the beginning and end of the through cut.
- j) Except for certain soil types or site conditions that require vertical cut slopes (e.g. Tonnini soils, rock outcrops) slope cuts will be designed and constructed to minimizing the risk of slope failure, soil disturbance and excessive excavation.
- k) In areas located on steep slopes or adjacent to watercourses where management of sidecast is not feasible, the practice of endhauling will be employed. A dump truck will transport the excavated material to a stable disposal area where sediment cannot deliver to any watercourses. Waste material will be seeded and mulched prior to October 15<sup>th</sup> of the same year.
- l) On side slopes greater than 50%, where the length of the road section is greater than 100 feet, fills greater than 4 feet in vertical height at the outside shoulder of the road will be constructed on a bench that is excavated at the proposed toe of the fill and is wide enough to compact the first lift and subsequent lifts compacted in approximately 1-foot intervals from the toe to the finished grade.
- m) Fills, including fills across watercourses, will be constructed to minimize erosion using techniques such as insloping, berms, rock armoring where appropriate, or other suitable methods.
- n) Where roads cross watercourses, the road prism will have a gradual transition to an insloped vertical curve as the road approaches and leaves the crossing (critical dip).
- o) Where feasible, and within the limits of safety considerations, all new seasonal secondary and spur roads will be constructed with an outsloped surface rather than a crowned road with an inside ditch. Outsloped roads can reduce potential maintenance problems caused by bank sloughing, ditch plugging, and drainage diversion.
- p) Turnouts will be placed at reasonable intervals along the alignment and will be located where a minimum of excavation will be necessary to increase the road width. Turnouts will not be constructed if fill is required on side slopes for their construction.
- q) No road construction will occur when soil moisture conditions would result in: a) reduced traction by equipment as indicated by spinning or churning of wheels or tracks in excess of normal performance; b) inadequate traction without blading wet soil; or, c) soil displacement in amounts that cause a visible increase in turbidity in any ditch or road surface that drains into a Class I, II, III, or IV waters, except that construction may occur on isolated wet spots arising from localized groundwater such as seeps or springs.



## **i. Drainage Structures**

- a) All new watercourse crossings will be constructed to minimize fill over the culvert.
- b) All culverted watercourse crossing replacements will be designed to handle a 100-year return interval flow event including sediment and debris. The design flow will be calculated using the Waananen and Crippen (1977) method for drainage areas greater than or equal to 80 acres. The Rational Method (Chow 1964) will be used when the drainage area for a crossing is less than 80 acres. Culverts will be sized to pass the 100-year flow event without overtopping (headwater depth to culvert diameter ratio (HW/D) = 1.0) which takes into account potential effects of sediment and debris. Other comparable flow design estimators that are developed for the North Coast Region may also be used.
- c) Watercourse crossings on temporary roads designed for one time summer season use, and then decommissioned, will be designed to carry the flow at the time of construction and will be removed and stabilized prior to October 15<sup>th</sup> of the same year.
- d) Bridges will be installed on fish bearing watercourses where feasible. When a bridge installation is not feasible, a countersunk or bottomless culvert or other “fish-friendly” structure will be installed that will provide upstream and downstream passage for all life stages of fish. Installed culverts will not restrict the active channel flow.
- e) Permanent watercourse crossings, road approaches to crossings, and associated fills will be constructed to prevent the potential diversion of stream overflows down the road and to minimize fill erosion should the drainage structure become obstructed (critical dip).
- f) All new culvert installations on watercourse crossings will be armored with rock (or other suitable erosion control products; i.e. matting) at the inlet and outlet. This practice will significantly reduce the erodible action on the fill surrounding the inlet. Armoring will extend at least 1 foot above the expected head and tail water elevations at the culvert. All bare soil on fill slopes at the culvert crossing will be seeded and/or mulched prior to the first winter period following installation to minimize erosion and promote revegetation.
- g) All watercourse crossings will be aligned with the natural grade and course of the stream to the fullest extent possible.
- h) Fill material over culvert installations will be compacted in 1-foot lifts and fill faces will be compacted during construction.
- i) A minimum culvert size of 24 inches will be used in all watercourse crossings, except for springs and seeps where such size would be unnecessary or impractical.
- j) No culvert will be allowed to discharge onto unstable slopes. When downspouts are used, they will be adequately secured to the culvert and they will be supported at intervals along their entire length.
- k) Ditches will be V-shaped and be approximately 1 foot deep relative to the subgrade. Ditches will be excavated into the road subgrade and not undercut the road cut slope. Where conditions warrant it, ditch alignment will be pulled away from the cut slope to provide storage room for hillslope ravel, and slumps, and to provide protection of ditch conveyance capability.

- l) Ditch relief culverts will be installed according to the specifications outlined in the Road Upgrading section (See Section D. II. e). Additional ditch relief culverts and rolling dips will be installed where appropriate to adequately disconnect the roads from the watercourses and to minimize ditch water accumulation on slide prone landforms such as inner gorges.
- m) Ditch relief culverts will normally consist of culverts with a minimum size of 18 inches.
- n) Ditch relief culverts will be discharged 50 to 100 feet before water enters a Class I, II or III watercourse to hydrologically disconnect the roads from the watercourse. Drains will discharge onto stable landforms with adequate energy dissipation and sediment filtering capacity. Outlets discharging onto erosion prone areas will be avoided or provided with effective erosion protection measures.
- o) Ditch relief culverts will have a grade that is at least 2% greater than a contributing ditch to prevent ponding and to ensure that they are self-cleaning.
- p) In general, steeper road grades (>8%) will utilize cross drains, and more moderate grades will utilize rolling dips and/or outsloping.

## **ii. New Landing Construction**

- a) Landings will be constructed to the minimum width, size and number consistent with the yarding and loading systems to be used.
- b) New landings will not be constructed in WLPZs or EEZs.
- c) Every reasonable effort will be made to limit new landing construction and associated excavation by landing logs on existing roadways where site-specific conditions allow. When it is necessary to construct landings, an emphasis will be placed on avoiding locating landings on steep or convergent slopes (topographic flats and divergent slopes will be used where possible).
- d) No landing construction will occur when soil moisture conditions would result in: a) reduced traction by equipment as indicated by spinning or churning of wheels or tracks in excess of normal performance, b) inadequate traction without blading wet soil, or c) soil displacement in amounts that cause a visible increase in turbidity in any ditch or landing surface which drains into a Class I, II, III, or IV waters.
- e) No fill will be placed and sidecast will be minimized on slopes greater than 65%.
- f) On side slopes less than 50%, sidecast or fill material extending more than 20 feet in slope distance from the outside edge of the landing and within 200 feet of a watercourse or lake will be seeded, planted, mulched, removed, or treated to minimize soil erosion. The intent is to minimize the amount of side cast particularly in locations where sidecast could directly enter a stream channel. Excess material will be deposited in a stable location where sediment will not deliver to any watercourses.
- g) Waste organic material such as uprooted stumps, cull logs, accumulations of limbs and branches, or unmerchantable trees will not be buried in landing fills. Slash and other organic debris may be placed and stabilized at the toe of landing fills to restrain fill soil from moving downslope.

### **iii. Erosion Control for New Roads**

- a) Procedures designed to ensure sediment is not mobilized during winter quad use and delivered to watercourses is provided in the Road Sediment Reduction Plan (See Section D IV)
- b) All watercourse crossings and cross drains will be installed and functional prior to the winter period as defined below. In addition, by the beginning of the winter period, all waterbars, rolling dips, and road and landing construction associated with straw mulching and grass seeding will be completed in order to minimize suspended or mobilized sediment delivery to a watercourse.
- c) All new cuts, fill slopes, stream crossings and designated end haul disposal sites will be seeded at a rate of at least 30 pounds per acre and mulched to a depth of at least 2 inches (before settling) with 90% surface coverage prior to the beginning of the first winter period following construction. A straw and grass cover on these areas will help to protect exposed soil from rain drop and sheet erosion processes prior to the establishment of native vegetation.
- d) All running surfaces of seasonal unsurfaced roads will be straw mulched and seeded prior to the first winter season following initial construction. This practice will protect against significant rain drop, sheet, and rill erosion on newly constructed, non-compacted, and unseasoned road surfaces.
- e) Where construction activities are conducted in close proximity to watercourses, additional erosion control protection measures will be utilized to trap sediment and minimize its entry into the watercourse. As required, slash filter windrows, silt fences, mulching and/or straw bale check dams will be used to control runoff over fill slopes and along concentrated runoff flow paths.
- f) At temporary crossings, the fill slope will be pulled back to the natural side slopes and deposited in a stable location where sediment will not deliver to any watercourses. All exposed areas associated with the crossing will be seeded at a rate of at least 30 pounds per acre and mulched to a depth of at least 2 inches (before settling) with 90% surface coverage.

## **IV. Road Sediment Reduction Plan**

In recognition of the sensitive geology and the erodible nature of the soils within large areas of the South Fork Elk River Watershed, GDRCo has developed a watershed plan incorporating measures designed to reduce sediment production from existing roads. This plan addresses the erodible nature of the soils within existing roadbeds and provides a mechanism to ensure that reasonable and feasible measures are undertaken to disconnect roadways from watercourses so that significant sediment delivery to aquatic habitat does not occur. The majority of operational activities occur during the summer season because of the lack of suitable rock nearby for road surfacing. Winter access on these erodible native surface roads with heavy equipment and pickups is not feasible. "Quad only" limited winter operations will be allowed for in THPs in this watershed. Winter quad use will ensure that GDRCo continues to have the needed access to property within the watershed so that THP layout, tree planting, and cutting activities, as well as other administrative functions can occur year round. The persistent use of quads on unsurfaced dirt roads during the winter months (in areas with erodible Wildcat soils) can mobilize sediments from the exposed road surface unless specific measures and procedures are undertaken to minimize these potential sediment sources, and they are disconnected from watercourses.

The following measures will be implemented to ensure sediment is not mobilized from existing roadways and deposited into aquatic habitat resources. Priority will be placed upon higher use roads and more vulnerable stream crossings. Practices proposed in this plan will also be utilized on new roads as they are developed in the future.

1. Ensure that all existing watercourse crossings have a properly designed “critical dip” installed at or immediately adjacent to the crossing to reduce diversion potential.
2. A disconnect rolling dip or water bar will be installed up grade from the crossing and designed to deposit on the forest floor. RPF’s or their designees will be responsible for identifying in the field the location for permanent rolling dips used to disconnect the road from the watercourse crossings.
3. Identify the main line administrative roads that will be utilized via quads on a more consistent basis during the winter months (e.g. S-1000, S-2000, S-2500 up to road point MC21road). All watercourse crossings will have a permanent rolling dip disconnect installed up grade from the crossing and designed to deposit on the forest floor. The disconnect rolling dip as well as a minimum of 75’ of road way leading into and including the crossing will be rocked. Filter fabric in conjunction with an average depth of 6” of clean rock will be used. If the roadway parallels a WLPZ, the distance to be rocked will be the length of the WLPZ road or 75’ which ever is longer.
4. Main line administrative roads will also be assessed to identify chronic erosion problems associated with isolated steeper road gradients. These sections of road will also be treated with an average depth of 6” of clean rock with filter fabric.
5. Where secondary roads are identified that are occasionally used during winter months for quad access, all watercourse crossings will be straw mulched and grass seeded for a minimum of 75’ including the disconnect rolling dip. If the roadway parallels a WLPZ, the distance to be mulched will be the length of the WLPZ road or 75’ which ever is longer. This measure has proven to be an effective erosion prevention method utilized extensively in the past on new roads within drainages with similar soil types. This option will allow GDRCo to effectively treat roads and crossings commensurate with their anticipated use (and risk of sediment mobilization).
6. Where extended segments of roadway are located in a through-cut or outside bermed condition, a permanent tractor or excavator constructed ditch-out will be built to further minimize the distance between rolling dips and water bars.
7. The interval of strategically placed rolling dips and waterbars will be installed according to the standards provided below to ensure that ditch line and surface road water from storm events is efficiently dispersed onto the forest floor. Additional rolling dips and waterbars will be installed if site specific erosion indicators continue to exist.

| <u>Road Grade</u> | <u>Maximum Spacing (feet)</u> |
|-------------------|-------------------------------|
| 2%                | 500                           |
| 4%                | 400                           |
| 6%                | 300                           |
| 8%                | 250                           |
| 10%               | 200                           |
| 12%               | 175                           |
| 14%               | 150                           |
| 16%               | 125                           |
| 18%               | 100                           |

8. Other erosion prevention methods such as silt fences or sediment settling basins will be utilized in site specific places where measures described above may not be adequate to prevent sediment input into watercourses.
9. All roads maintained for consistent or occasional winter quad use (See Road Sediment Reduction Plan below) will be signed "Consistent Winter Quad Use OK" or "Occasional Winter Quad Use OK", respectively. All other roads within the watershed will have no quad use during the winter period.

The measures provided above will not only aid in significantly reducing sediments mobilized from winter quad use, but also dramatically reduce the potential for sediment introduction into streams from normal sheet erosion and rilling that can occur on unsurfaced roads located in the Wildcat geology type that experience no winter quad traffic.

## **V. Road Maintenance**

1. Road maintenance activities include brushing, waterbarring, constructing rolling dips, culvert replacement, grading (including berm removal or maintenance where appropriate), installation of critical dips at watercourse crossings to reduce diversion potential, outsloping roads, patch rocking, dust abatement, resurface rocking, cleaning ditches, and cleaning inlets and outlets of culverts.
2. Road maintenance activities, other than by hand labor, will only be conducted during the non-winter period due to equipment access limitations.
3. Grading will not be used to blade off wet soil to provide conditions for extended periods of operation on a deteriorated road surface.
4. Roads appurtenant to THPs will be inspected through the duration of the WDR Permit period. This inspection will assess the effectiveness and condition of all erosion control and drainage structures.
5. The inspections will assess the following:
  - Adequate waterbar and/or rolling dip spacing, depth, interception of the ditch line, and complete diversion of water flow onto undisturbed soil.
  - Adequate road surface drainage and all outside berms are breached.

- Ditches are open and properly functioning, free of debris that could plug the ditch or a culvert and cause a diversion of water onto the road surface.
  - Culverts are functioning properly (e.g., the culvert is not rusted out or separated at a joint; water is flowing through the pipe and not underneath; sediment and debris is not reducing the pipe capacity).
6. The road maintenance assessment will be completed with enough time to initiate and complete all necessary repairs prior to winter period.
  7. Landing debris associated with harvesting operations will be evaluated to determine the need for either burning or pull-back to reduce any potential for landing failure and debris avalanches associated with overloading the landing with slash.
  8. Upon completion of timber operations, landings will be drained to prevent water accumulation. Concentrated flows will not be channeled over fills and will only be discharged onto stable areas. Discharge points will be located on stable landforms and where stable discharge points are absent, adequate erosion protection and energy dissipation will be employed.

## E. Seasonal Restrictions

As previously described in this Plan, the South Fork Elk River has a uniquely erodible soil type that is not only easily mobilized with vehicular traffic but tire traction is completely lost with the slightest amount of road surface moisture. This situation coupled with lack of rock for road surfacing and the remoteness of the watershed results in a shorted operating window. The following measures reflect these conditions and the need to appropriately address them to minimize impacts to aquatic resources.

1. The winter period for this management plan is from Oct. 15<sup>th</sup>, to May 15<sup>th</sup>. An exception to this will be limited to the brief time frame from Oct. 15<sup>th</sup> to Nov. 1<sup>st</sup>, and from May 1<sup>st</sup> to May 15<sup>th</sup> when the potential for extended seasonal dry periods exist. This exception will be implemented only when conditions warrant in any specific year and when a representative from Water Quality and CDF concur with the exception proposal. This stipulation acknowledges the sensitivity of the watershed and associated soils, while providing flexibility to achieve harvest and road repairs/upgrading goals in a “short season, limited access” area when conditions warrant.
2. Yarding (except helicopter yarding with no heavy equipment), hauling, or road construction activities will not occur during the winter period (as defined above). Timber falling, site preparation (pile burning), and administrative access (THP preparation, planting, monitoring) can be conducted year round.
3. Log hauling will be suspended, regardless of the time of year, if a storm event causes saturated soil conditions on haul roads. Hauling will not be resumed until the RPF or his designee determines that the road can withstand truck traffic without causing deterioration of the road surface and subsequent loss of surface material. Operation of trucks and heavy equipment on roads and landings will be limited to those with a stable operating surface.
4. Access during the winter period for activities such as timber falling, site preparation burning, maintenance inspections, reforestation, or timber harvesting plan layout will be restricted to the use of low ground pressure all terrain vehicles operating on designated signed roads only (See Road Sediment Reduction Plan, Section D IV).